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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

| | |
|---|---|
| RICOH COMPANY, LTD.,<br><br>Plaintiff,<br><br>vs.<br><br>AEROFLEX INCORPORATED, et al.,<br><br>Defendants | **CASE NO. C-03-2289-MJJ (EMC)**<br><br>**CASE NO. C-03-4669-MJJ (EMC)**<br><br>**DISCOVERY MATTER** |
| SYNOPSYS, INC.,<br><br>Plaintiff,<br><br>vs.<br><br>RICOH COMPANY, LTD.,<br><br>Defendant. | **DECLARATION OF EDWARD A. MEILMAN IN SUPPORT OF RICOH'S REPORT TO THE COURT PURSUANT TO MAY 3, 2004 ORDER REGARDING POSSIBLE THOMAS DEPOSITION**<br><br>**Date: None**<br>**Time: None**<br>**Courtroom:**<br>**Judge: Magistrate Judge Chen** |

Edward A. Meilman declares as follows:

1. I am an attorney with the law firm of Dickstein, Shapiro, Morin & Oshinsky, LLP, counsel for Ricoh Company Limited. I am over the age of 21 and am competent to make this declaration. Based on my personal knowledge and information, I hereby declare to all the facts in this declaration

2. Attached hereto as Ex. 1 is a true and correct copy of the Order issued by Magistrate Judge Chen on May 3, 2004.

3. Attached hereto as Ex. 2 is a true and correct copy of pages 35, 36, 40, 45 and 46 of the transcript of a hearing before Magistrate Judge Chen on March 24, 2004.

4. Attached hereto as Ex. 3 is a true and correct copy of the entirety of defendants' June 11, 2004 communication pursuant to this Court's May 3, 2004 Order, page 2, lines 11-14, Ex. 1.

5. Prior to June 11, 2004, the defendants took depositions of Dr. Kobayashi, International Chip Corporation, Knowledge Based Silicon Corporation and Ricoh and also took the deposition of a professor (Dr. Davis) at the University of South Carolina.

6. Defendants proffered a declaration by Dr. Kowalski (see Exhibit 2) setting forth what Dr. Kowalski thinks is the extent of the overlap of knowledge between himself and Dr. Thomas. No such declaration by Dr. Kowalski has ever been submitted to Ricoh or the Court.

7. The defendants have stated that Dr. Alice Parker, one of the coauthors of the article identified in topic 1 of Ex. 3, is consulting for defendants in these actions but no declaration from her has been received.

8. Prior to June 11, 2004, defendants served a subpoena on IBM for documents and a deposition but after receiving the documents, decided to cancel the deposition of IBM.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Signed at New York, New York on June 30, 2004.

June 30, 2004

/s/ Edward A. Meilman
Edward A. Meilman

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SYNOPSYS, INC.,

Plaintiff,

v.

RICOH CO., LTD.,

Defendant.

_____/

RICOH CO., LTD.,

Plaintiff,

v.

AEROFLEX, et al.,

Defendants.

_____/

No. C-03-2289 MJJ (EMC)
No. C-03-4669 MJJ (EMC)

**ORDER RE JOINT REPORT TO THE COURT REGARDING POSSIBLE THOMAS DEPOSITION**

Having reviewed the joint report filed by the parties regarding the possible deposition of Dr. Thomas, and good cause appearing therefor, the Court hereby orders as follows.

The burden is on the ASIC Defendants and Synopsis (collectively "Defendants") to demonstrate their entitlement to take Dr. Thomas's deposition. As previously noted, Defendants have the burden of demonstrating that Dr. Thomas has unique or superior knowledge. In directing the parties to meet and confer to work out a procedure to facilitate such determination, including the possibility of an appointed neutral master, the Court did not prescribe or foreclose any particular procedure.

The phased approach suggested by Defendants is not unreasonable in concept. By defining with reasonable precision the subject matters on which they would like to depose Dr. Thomas – and therefore on which the determination of unique or superior knowledge would be made – the parties and the Court can better assess what procedural mechanism might be appropriate (*e.g.*, appointment of special master to investigate, production of declarations of Defendants' experts, limited deposition of Dr. Thomas, etc.). The Court will also have concrete facts on which to gauge the proper scope of any such inquiry, mindful of its earlier observation that privileged matters arising out of Dr. Thomas's engagement with Ricoh will be protected. Ricoh has failed to demonstrate why the proposed first phase of identification of topics by Defendants, in and of itself, will prejudice Ricoh. Nor has Ricoh demonstrated that giving the Defendants until June 11, 2004, to make that identification is prejudicial.

Accordingly, the Court orders that Defendants shall identify by June 11, 2004, in detail the subject matters on which they would like to depose Dr. Thomas and on which they will have to demonstrate his unique or superior knowledge, as well as any information they wish to present as to why these subjects may not be in the possession of other witnesses. The parties shall then meet and confer and attempt to negotiate a mechanism facilitate the Court's determination whether Dr. Thomas as such unique or superior knowledge. The parties shall be mindful of the need to protect privileged communications and work product against disclosure. Defendants are forewarned, however, that in meeting their burden of demonstrating their right to take Dr. Thomas's deposition, they may be required to chose between what they have characterized as the costly procedure of retaining a referee who can make the inquiry while preserving the parties' privileges or having to disclose the full extent of knowledge possessed by all those available to them, including their expert witnesses. Ricoh is cautioned that, so long as the areas of proposed inquiry are limited to prior art and not an evaluation (comparative or otherwise) of the patents in dispute, the risk of breaching any privilege is minimal.

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The parties shall report back to the Court by June 30, 2004 on the results of their meet and confer by joint letter. If they cannot agree, the parties shall each propose a specific mechanism for determining whether Dr. Thomas has unique or superior knowledge on particular subjects.

IT IS SO ORDERED.

Dated: May 3, 2004

/s/
EDWARD M. CHEN
United States Magistrate Judge

SAYING, DR. THOMAS WOULD HAVE KNOWLEDGE, IN ADDITION TO MINE, IN THE FOLLOWING SPECIFIC AREAS. WITH THAT SHOWING, THAT COULD DEFINE THE CONTOURS OF A PROPOSED DEPOSITION, IF THAT IS, IN FACT, INFORMATION THAT CANNOT BE OBTAINED FROM ANY OTHER SOURCE.

**THE COURT:** ALL RIGHT, WHAT ABOUT THAT? SURE, DR. KOWALSKI MAY NOT KNOW FOR SURE WHAT DR. THOMAS KNOWS, THAT HE DOES NOT KNOW, OBVIOUSLY; BUT, HE CERTAINLY COULD HAVE SOME EDUCATED INSIGHT AS TO WHAT HE IS LIKELY TO KNOW, THAT HE DOES NOT KNOW. WHAT IS THE MATTER WITH THAT, AS A **PRIME FACIE** STEP HERE?

**MISS CORBIN:** I JUST THINK IT IS UNWORKABLE, YOUR HONOR. I THINK DR. KOWALSKI WILL BE IN THE EXACT SAME POSITION I AM TODAY, EXCEPT OR TO THE EXTENT OF, ANY ACTUAL INTERACTION HE HAS HAD WITH DR. THOMAS, WHERE HE KNOWS WELL, I INFORMED HIM OF X, Y AND Z, AND HE KNOWS ABOUT THAT SUBJECT AREA. AS TO ANYTHING ELSE, YOU KNOW, HE WILL HAVE NO INFORMATION, SO HE WILL NOT BE ABLE TO TESTIFY. THAT IS WHAT I AM TRYING TO GET ACROSS THAT, AT THE END OF THE DAY, EVEN IF WE DID THAT, AND EVEN IF WE TOOK OTHER DISCOVERY, WE STILL WILL NOT KNOW THAT THERE IS NOT MATERIAL INFORMATION, ADDITIONAL INFORMATION, THAT DR. THOMAS HAS, THAT IT BEARS LIGHT ON THE VALIDITY OR INVALIDITY OF THIS PATENT.

**THE COURT:** YES, BUT WE ARE NOT DEMANDING CERTAINTY. WHAT WE ARE TALKING ABOUT HERE IS, CERTAINLY HE HAS, HE

CERTAINLY WAS INVOLVED, AND HE CAN SAY SUCH THINGS AS WELL, HE CAN ELABORATE, FOR INSTANCE, MORE ON WHAT YOU STARTED TO TALK ABOUT, AND THAT IS: AS MY ROLE AS A GRADUATE STUDENT, WORKING ON SOME SUBSET OF DAA, I ONLY WORKED ON, YOU KNOW, THESE PORTIONS OR THIS ASPECT; I DID NOT WORK ON, AND IT IS UNLIKELY THAT ANY OTHER GRADUATE STUDENTS WOULD HAVE WORKED ON, YOU KNOW, SORT OF EVERYTHING ELSE, AND THAT HERE ARE THE KINDS OF THINGS THAT DR. THOMAS WOULD LIKELY KNOW THAT I WOULD KNOW.

**MISS CORBIN:** I AM SORRY. ARE YOU SUGGESTING HE PROVIDE A DECLARATION AS TO THESE FACTS?

**THE COURT:** YES.

**MISS CORBIN:** WE COULD CERTAINLY DO THAT. I DO NOT THINK IT RESOLVES OUR ISSUE, OR OUR PROBLEM, NOR THE FACT THAT NONE OF EITHER THE CASES, THE ADVISORY COMMITTEE NOTES, THE PUBLIC POLICY, OR THE PUBLIC INTEREST, SUPPORT HAVING THIS BURDEN PUT ON THE DEFENDANTS AT THIS STAGE.

**THE COURT:** I BELIEVE THE **WANG VS. TOSHIBA** CASE MAKES SOME REFERENCE TO HOW YOU MIGHT HAVE A -- YOU MIGHT NOT DISQUALIFY AN EXPERT, IF THE CONSULTANT'S INVOLVEMENT WERE "UNIQUE," WAS THE WORD IN THE COURT. I MEAN, IT DOES LOOK TO, IT SEEMS TO ME, AT LEAST IMPLICITLY, THE NEED, AND WHERE THERE IS A RISK OF, PERHAPS, SOME COMPROMISE AND SOME UNFAIRNESS, WHEN SOMEBODY WAS INDEED RETAINED. YOU KNOW, I DO NOT SEE WHY THERE SHOULD NOT BE SOME SHOWING THAT THE BENEFIT OUTWEIGHS THE BURDENS, EVEN IF IT IS JUST UNDER A RULE 26(B)(2) ANALYSIS.

ACTUALLY ALSO HAPPENS TO BE A PERCIPIENT WITNESS, WITH MATERIAL INFORMATION TO THE CASE. THERE IS NO SUGGESTION IN ANY OF THOSE CASES, OR THE ADVISORY COMMITTEE NOTES, OR ANYTHING ELSE, THAT SUCH A SHOWING NEED BE MADE, BEFORE THAT TYPE OF DISCOVERY BE HAD.

MY FINAL CONCERN IS, IF WE WENT FORWARD, ALONG THE LINES YOUR HONOR SUGGESTS, WE WOULD BE HAPPY TO PREPARE A DECLARATION, AND DR. KOWALSKI MAY BE ABLE TO SPEAK TO WHAT HE THINKS IS THE OVERLAP OF KNOWLEDGE BETWEEN HIMSELF AND DR. THOMAS. HE WOULD ALSO THEN, IN FAIRNESS, HAVE TO SAY HE DOES NOT KNOW, FOR INSTANCE, WHAT OTHER, YOU KNOW, PRIOR ART REFERENCES DR. THOMAS MAY KNOW OF, WHAT CONFERENCES -- HE HAS NOT ATTENDED ALL THE CONFERENCES DR. THOMAS HAS -- ET CETERA, ET CETERA.

MY CONCERN IS, GIVEN THE KIND OF ALLEGATIONS WE GET AT EVERY TURN, THAT THAT IS THEN GOING TO BE SEEN AS SELF-SERVING, BUT WE WOULD BE HAPPY TO DO THAT, I MEAN, WE COULD DO THAT. I JUST THINK THAT, AT THE END OF THE DAY, IT IS STILL NOT GOING TO ANSWER THE ULTIMATE QUESTION OF WHETHER DR. THOMAS HAS SOME SET OF INFORMATION MATERIAL TO THE VALIDITY OF THIS PATENT, THAT OTHERS DO NOT. WE WILL KNOW WHERE THE OVERLAP IS, BUT WE WILL NOT KNOW WHETHER THERE IS OTHER INFORMATION.

**MR. BROTHERS:** YOUR HONOR, ANOTHER IDEA THAT JUST POPPED INTO MY HEAD, SO IT IS PROBABLY DANGEROUS TO MENTION IT.

THEN TELL ME WHERE YOU ARE AT. IF YOU THEN AGREE FROM THAT, TO GO FORWARD WITHIN THE ACTUAL DEPOSITION MECHANISM, THAT IS GREAT, YOU CAN ALWAYS SIGN A STIPULATION. OR, IF YOU GET TO THAT POINT, BUT YOU CANNOT AGREE ANY FURTHER, LET ME KNOW, AND I THEN WILL HAVE TO RULE, BASED ON -- WELL, I WILL FIGURE OUT WHERE WE GO -- WE HAVE TO GET A REPORT FROM THIS STIPULATED PERSON, OR SPECIAL MASTER, AND RULE ON THE BASIS OF THAT.

**MR. BROTHERS:** AS I UNDERSTAND IT, THE INQUIRY SHOULD BE PRINCIPALLY FOCUSED UPON IDENTIFYING THE AREAS OF INFORMATION THAT DR. THOMAS MAY HAVE, THAT ARE EITHER UNIQUE TO HIM OR, AS YOU SAID, ON A SLIDING SCALE, PERHAPS IDENTIFYING OTHERS THAT MAY HAVE THAT INFORMATION; BUT DR. THOMAS MAY HAVE MORE INFORMATION.

**THE COURT:** UNIQUE OR SUPERIOR, IS ONE WAY TO PHRASE IT, I SUPPOSE. ALL RIGHT, WHY DO NOT WE SEE IF THIS HELPS UNLOCK THIS DISPUTE, AND IF NOT -- MR BROTHERS?

**MR. BROTHERS:** JUST TO FOLLOW-UP, ONE CLARIFICATION: THE FLIP SIDE BEING THAT, TO THE EXTENT THAT THERE IS INFORMATION THAT OTHERS -- WHETHER DR. KOWALSKI OR OTHERS -- ARE EQUAL TO, OR THEY HAVE SUPERIOR INFORMATION, THAT WOULD NO LONGER BE ON THE TABLE, FOR EVEN A PROPOSED SCOPE OF DEPOSITION; IT WOULD BE FOCUSING SOLELY ON THEN UNIQUE, OR SUPERIOR TO?

**THE COURT:** YES. DEFENDANTS MAY NOT AGREE WITH THAT VIEW, BUT THAT IS MY VIEW: THAT WITHOUT SOME KIND OF

SHOWING OF WHY DR. THOMAS OFFERS, IF NOT UNIQUE, CERTAINLY SUPERIOR, KNOWLEDGE ON PARTICULAR SUBJECTS, I JUST DO NOT SEE -- TO ME THERE IS ENOUGH OF A RISK HERE THAT I JUST DO NOT THINK IT IS WARRANTED -- AND IT DOES SEEM TO ME THERE SHOULD BE SOME SHOWING, AND EXACTLY WHAT THAT SHOWING IS, I AM NOT SURE AT THIS POINT. I WOULD HAVE TO LOOK AT CASE LAW, IF PUSH CAME TO SHOVE, A LITTLE MORE CAREFULLY BUT, CERTAINLY, IF IT WERE THE CASE THAT HE KNEW NOTHING MORE THAN DR. KOWALSKI, AND PERHAPS OTHERS KNOW EXACTLY EVERYTHING HE DID, I JUST DO NOT SEE THE NEED AT THAT POINT, ALL RIGHT? I SOMEHOW SUSPECT THAT WILL NOT BE THE CASE, BUT AT LEAST WE WILL FIND OUT. ALL RIGHT, I AM GETTING HAND SIGNALS HERE.

**MISS CORBIN:** EXCUSE ME, ONE SECOND.

**THE COURT:** ALL RIGHT. LET ME ADDRESS MYSELF TO THE SANCTIONS ISSUE. I WILL TELL YOU THAT WITH THE HELP OF MY LAW CLERK, WE WENT THROUGH THESE AND DID AN EXHAUSTIVE CHRONOLOGY OF EVERYTHING IT WAS SUGGESTED THAT WE COULD. WE WENT THROUGH QUITE A BIT OF THIS, AND I AM NOT GOING TO REPRESENT THAT WE WERE NOT A BIT CONFUSED BY THE FACTS OCCASIONALLY, BUT I HAVE A PRETTY GOOD SENSE OF WHAT HAPPENED, AND WHAT THE PARTIES' CONTENTIONS ARE. AND I WILL TELL YOU, THAT IT DOES SEEM TO ME, THAT FIRST OF ALL, WITH RESPECT TO THE STANDARD, UNDER THE INHERENT POWER OF THE COURT, UNDER SECTION 1927 -- PUTTING ASIDE WHETHER IT IS CLEAR AND CONVINCING OF PREPONDERANCE -- THERE DOES HAVE TO BE A SHOWING OF SOME BAD FAITH, WILLFULNESS,

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# FACSIMILE COVER SHEET

**DATE:** June 11, 2004

**TO:**

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**FROM:** NAME: Matthew E. Hocker

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NUMBER OF PAGES, INCLUDING COVER: 12 CHARGE NUMBER: 06816.0060 and 06816.0061

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IF THERE ARE ANY QUESTIONS OR PROBLEMS WITH THE TRANSMISSION OF THIS FACSIMILE, PLEASE CALL 650.463.8103.

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A LIMITED LIABILITY PARTNERSHIP

June 11, 2004

**VIA FACSIMILE AND U.S. MAIL**

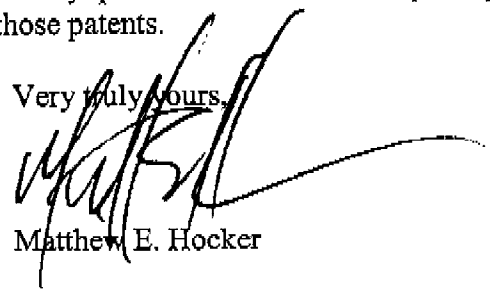
Kenneth W. Brothers
Dickstein Shapiro Morin & Oshinsky, LLP
2101 L Street NW
Washington, D.C. 20037

Re: *Synopsys, Inc v. Ricoh Company, Ltd.*
Case No. CV 03-02289 MJJ (MCC)
*Ricoh Company, Ltd. v. Aeroflex, Inc.*
Case No. CV 03-04669 MJJ (MCC)

Dear Ken:

Enclosed please find a set of questions to be put to Dr. Thomas in a deposition. As suggested in the Court's Order of May 3, we have focused the inquiry exclusively on technical matters relating to prior art logic synthesis systems and the content of Dr. Thomas' prior art writings. We do not intend to ask Dr. Thomas any questions about the Kobayashi patents, or indeed any matter arising after the filing of those patents.

Very truly yours,



Matthew E. Hocker

MEH:gj
Enclosure

cc: Edward A. Meilman
Gary M. Hoffman

1. **RE: DIRECTOR, PARKER, SIEWIOREK, AND THOMAS, "A DESIGN METHODOLOGY AND COMPUTER AIDS FOR DIGITAL VLSI SYSTEMS," IEEE TRANS. ON COMPUTERS AND SYSTEMS, VOL. CAD-28, NO. 7 (JULY 1981) [DEF016252-16263].**

1.a Regarding the passage discussing Data Path Synthesis on p. 635 ("The next step in the design process is to synthesize from the behavioral description a structure in terms of physical modules which will implement the required behavior. [...] Synthesis of the data path is separated into two steps: 1) Generation of a register-transfer level structure of the data path, called the data path graph. 2) The specification of the interconnection of physical modules which implement the data path functions. The first step is referred to as data path allocation while the second step is referred to as module binding. The result of the second step is a bound path graph.").

What was the origin of the definition of synthesis contained in this passage?

Can Dr. Thomas recall or identify occasions on which this or other similar definitions of synthesis were used by persons working in the area?

What synthesis systems was Dr. Thomas aware of in the 1980s (or earlier) that implemented either of data path synthesis functions and controller synthesis functions?

What were the technical characteristics of those systems?

How did Dr. Thomas learn of those systems? Were those systems discussed at public conferences? Were those systems demonstrated? What interaction (if any) did Dr. Thomas have with the principals involved in development of those systems or other individuals who used those systems?

Did Dr. Thomas ever hear other professionals working in the field refer to the specification of the interconnection of physical modules" as "module binding.?" On what occasions and by whom?

What synthesis systems was Dr. Thomas aware of in the 1980s (or earlier) that performed module binding of either data paths or controller logic?

What were the technical characteristics of those systems?

How did Dr. Thomas learn of those systems? Were those systems discussed at public conferences? Were those systems demonstrated? What interaction (if any) did Dr. Thomas have with the principals involved in development of those systems or other individuals who used those systems?

1.b Regarding the passage on p. 635 discussing High-Level Behavioral Description ("As indicated in Fig. 1, the design process begins with a behavioral specification of the digital system to be designed. Such a specification provides a model which accurately characterizes the input-output behavior of the system without reflecting any internal structure. This level of specification might be expressed in terms of a flowchart, or as we choose to do below, in terms of a high-level hardware description language.")

Is the system illustrated in Figure 1 representative of any synthesis systems constructed at CMU?

How were the authors of the paper first introduced to the idea of using a "behavioral description" of a system as input to the design process?

Who first raised the possibility of expressing the input specification in terms of a flowchart?

What are all the types of inputs that were discussed or developed? Who was involved in the discussions? Who worked on them?

On page 637 the paper states that "We have chosen the ISP (for Instruction Set Processor) language to provide this behavioral specification." How was this decision made? What alternative inputs were considered?

1.c Regarding the discussion of a module database on p. 636 ("The output of the data path allocator is a register-transfer level description of the necessary data path. The module binding step specifies an interconnection of physical blocks contained in a module database to implement the data path logic.") and id (section under heading "C. Module Database.")

What relationship, if any, is there between a hardware library and the module database referred to in the article?

Did any of the CMU synthesis systems developed or implemented prior to 1988 include a module database or a data path allocator?

In the 1980s was Dr. Thomas aware of any other synthesis systems that included a module binding step?

What were the technical characteristics of those systems?

How did Dr. Thomas learn of those systems? Were those systems discussed at public conferences? Were those systems demonstrated? What interaction (if any) did Dr. Thomas have with the principals involved in development of those systems or other individuals who used those systems?

1.d Did Dr. Thomas discuss the concepts described in the [Director81] article with anyone prior to 1988? What are the particulars of those conversations?

**2. RE: THOMAS, "THE AUTOMATIC SYNTHESIS OF DIGITAL SYSTEMS," PROCEEDINGS OF THE IEEE, VOL.69, NO.10 (OCT. 1981) [DEF076286-076298].**

2.a Regarding the passage discussing "design synthesis work to be surveyed" (p. 1205):

What was the source for the information regarding the IBM logic synthesis systems discussed by Dr. Thomas at pages 1205, 1208-1209?

What exposure did Dr. Thomas have to the work done at IBM in logic synthesis in the 1980s? Did he meet with any of the principals involved in that work? On what occasions? Did he see demonstrations of any of the systems developed at IBM? Did he hear presentations regarding these systems?

What was the source for the information regarding the MIMOLA design system discussed by Dr. Thomas at pages 1205, 1206-1207?

What exposure did Dr. Thomas have to the work done in Germany on the MIMOLA logic synthesis system in the 1980s? Did he meet with any of the principals involved in that work? On what occasions? Did he see demonstrations of the MIMOLA systems? Did he hear presentations regarding these systems?

What was the source for the information regarding the ALERT and EXPL systems discussed by Dr. Thomas at pages 1205-1206?

What exposure did Dr. Thomas have to the work done in Germany on the MIMOLA logic synthesis system in the 1980s? Did he meet with any of the principals involved in that work? On what occasions? Did he see demonstrations of the MIMOLA systems? Did he hear presentations regarding these systems?

2.b Regarding the passage discussing the LSMS design aid and the D/M Allocator (p. 1208):

What individuals worked on the LSMS design aid and the D/M Allocator? What roles did each individual play? When was the work on these systems completed?

Where these two systems disclosed to persons beyond those directly involved in development of these systems? What were the circumstances of those disclosures?

Were the LSMS design aid and the D/M Allocator capable of operating together? How did they interact?

What was the particular form of the design input to the D/M Allocator? What was the form of the design input to the LSMS design aid?

2.c Regarding the passage on p. 1201 discussing division of a digital system into control and data portions ("Common to all of these levels of representation is the notion that a digital system can be divided into two major parts: control and data. [...] These types of representation within a level merely reflect the standard control and data part partitionings prevalent in the digital design process":

What was the basis for the assertion that a digital system can be divided into control and data parts?

Had Dr. Thomas discussed the fact that digital systems could be so partitioned with any other practitioners prior to preparing this article? Did he discuss this potential partitioning with others prior to 1988? What are the particulars of those discussions? Is this partitioning discussed in other references to Dr. Thomas' knowledge?

Is Dr. Thomas aware of publications from the 1980s suggesting that control and data parts of a design could be treated separately for the purposes of logic synthesis?

Is Dr. Thomas aware of any logic synthesis systems from the 1980s that treated control and data parts of a design separately during synthesis operations?

Does Dr. Thomas recall conversations in which he participated where the possibility of performing separate or discrete synthesis operations on data and control portions of a design was discussed? What are the particulars of those discussions?

the source for the information regarding the IBM logic synthesis systems discussed by Dr. Thomas at pages 1205, 1208-1209?

What exposure did Dr. Thomas have to the work done at IBM in logic synthesis in the 1980s? Did he meet with any of the principals involved in that work? On what occasions? Did he see demonstrations of any of the systems developed at IBM? Did he hear presentations regarding these systems?

**3. RE: WALKER, THOMAS, "A MODEL OF DESIGN REPRESENTATION AND SYNTHESIS," PROCEEDINGS OF 22ND DESIGN AUTOMATION CONFERENCE AT PP. 453-459 [DEF017645-017651]**

3.a The article discusses three different domains of design representation: behavioral, structural and physical. See, e.g., pp. 453-454, FIGS. 1-1, 2-1, and Table 2-1.

What was the origin of this distinction? Had Dr. Thomas discussed the characterization of designs in these three different domains with other practitioners in the field prior to writing this DAC presentation? Did he discuss it with individuals in the field, during the 1980s but after this DAC presentation?

Is Dr. Thomas aware of other articles or presentations that discuss the organization of design in these three different domains? What are the particulars of these treatments?

3.b The article also discusses how synthesis can be characterized as translation between different points in these three different domains. See pp. 458, FIG. 5-1.

What are the operations that are being performed in each of the arcs in Figure 5-1? In particular, what does it mean to go from "algorithms" to "register transfers" in a behavioral representation? What happens during "data path and controller allocation"? What happens during "module binding"?

The article states that "Figure 5-1 shows some examples of synthesis task in the CMU-DA [6] design methodology." What were the analogs, in the CMU-DA system, of each of the arcs shown in Figure 5-1? What modules within the system performed these functions and what were the inputs and outputs of each of these modules?

Were there other logic synthesis systems that Dr. Thomas was aware of prior to 1988 that implemented similar transitions from the Behavioral domain to the Structural domain and from the Structural domain to the Physical domain?

What were the technical characteristics of those systems? How did these systems implement the transitions between each of the three domains identified in Dr. Thomas' article?

How did Dr. Thomas learn of those systems? Were those systems discussed at public conferences? Were those systems demonstrated? What interaction (if any) did Dr. Thomas have with the principals involved in development of those systems or other individuals who used those systems?

3.c With respect to the discussion of "algorithmic level" circuit descriptions on page 456 ("This level, often called the Behavioral Level, describes the design at a level syntactically similar to programming languages. [...] Examples of Behavioral Domain components at this level are instruction decoding, effective address calculation, and instruction execution."):

Is Dr. Thomas familiar with any occasions in 1980s in which "algorithmic level" design descriptions were used as inputs, or discussed as possible inputs, to the logic synthesis process? What are the details of those uses or discussions? What logic synthesis systems, if any, developed or used during

the 1980s employed "algorithmic level" design descriptions as inputs to the logic synthesis process?

What were the technical characteristics of those systems? How did these systems implement the transitions between each of the three domains identified in Dr. Thomas' article?

How did Dr. Thomas learn of those systems? Were those systems discussed at public conferences? Were those systems demonstrated? What interaction (if any) did Dr. Thomas have with the principals involved in development of those systems or other individuals who used those systems?

Did Dr. Thomas discuss the possible use of "algorithmic level" descriptions as inputs to logic synthesis systems with other persons working in the field at any time during the 1980s? [Apart from this article.] What was the occasion and who were the participants in those discussions?

Is Dr. Thomas aware of other articles or writings from the 1980s that discuss the possible use of "algorithmic level" descriptions as inputs to logic synthesis systems? What are the details of those writings?

**4. RE: HITCHCOCK & THOMAS, "A METHOD OF AUTOMATIC DATA PATH SYNTHESIS, PROCEEDINGS OF THE 20TH DESIGN AUTOMATION CONFERENCE AT PP. 484-489 [DEF075395-075400]**

4.a The article refers to "register-transfer designs" and "register-transfer" description of a design. (See list of keywords and text on [DEF075395].)

What is the meaning of "register-transfer" as it is used in this article? How did the authors of this article become aware of this phrase?

Had Dr. Thomas heard other practitioners in the field refer to "register transfer" descriptions of a circuit design before this article was prepared in 1983? Where and how did Dr. Thomas hear this phrase used?

**5. RE: KOWALSKI & THOMAS, "THE VLSI DESIGN AUTOMATION ASSISTANT: WHAT'S IN A KNOWLEDGE BASE," PROCEEDINGS OF THE 22ND DESIGN AUTOMATION CONFERENCE AT 252-258 [DEF022874-22880]**

5.a The article refers to the Design Automation Assistant as a "knowledge-based expert system." (See first paragraph and list of keywords on [DEF022874].) The paper also refers to a "knowledge base," including a reference in the title of the paper.

How did Dr. Thomas first become aware of the phrase "knowledge-based expert system?"

How did Dr. Thomas first become aware of the phrase "knowledge base?"

On what occasions had Dr. Thomas heard these phrases before writing this 1985 paper?

5.b Which elements of the Design Automation Assistant employed a "knowledge-based expert system" and/or a "knowledge base?" What characteristics of these systems qualified them as a "knowledge-based expert system" or a "knowledge base?"

## 6. CARNEGIE MELLON SYNTHESIS SYSTEMS

6.a The following questions are presented with respect to each of the various logic synthesis systems developed by personnel at Carnegie-Mellon University, which include:

RT-CAD

Design Automation System (CMU-DA) (including Sugar, Logic Synthesis and Module Selection (LSMS) and Data/Memory Allocator (D/M Allocator))

System Architect's Workbench

Design Automation Assistant (DAA)

6.b Who developed these systems? What was Dr. Thomas' role in that development? During what time frame were these systems developed?

6.c Where these systems disclosed to individuals beyond those directly involved in their development? When did this disclosure take place? To whom was the disclosure made? Were any of these systems, or the components that make up the systems, demonstrated to persons beyond the development team at any point? When and to whom? Were these systems used to perform synthesis of any circuit designs?

6.d What was the form, or forms, of the design input that were processed by these systems?

What system modules were responsible for processing that input?

What was the format of the input to these modules and the output from these modules? What other parts of the system did these modules interact with?

Was the design input an "algorithmic level" description? Was it a "register transfer level" description? [See DEF017649]? Did the design input have to provide a description of the operation of the system on a clock cycle by clock cycle basis?

6.e Did these systems perform a "control step partitioning" operation? [See DEF017650, FIG. 5-1]

What system modules were responsible for performing "control step partitioning"?

What was the format of the input to these modules and the output from these modules? What other parts of the system did these modules interact with?

6.f Did these systems perform either of "data path allocation" or "controller allocation?" [See DEF017650, FIG. 5-1]

What system modules were responsible for performing these functions?

What was the format of the input to these modules and the output from these modules? What other parts of the system did these modules interact with?

6.g Did these systems perform "module binding" functions? [See DEF017650, FIG. 5-1]

What system modules were responsible for performing these functions?

What was the format of the input to these modules and the output from these modules? What other parts of the system did these modules interact with?

How was information regarding the available modules supplied to these systems? Were module libraries were used? What was the form of the information in those libraries?

6.h What types of optimizations did these systems perform?

Are optimizations performed when the systems is characterized as a collection of high-level components such as adders and multipliers? Are optimizations performed when the system is described as a collection of basic logic gates?

6.i Did these systems synthesize a control flow for the circuit?

What information, if any, about control flow was provided by the user as part of the design input? Were any optimizations performed on the control path?

Did the systems synthesize a controller for the circuit? If the user provides information relevant to the design of the controller, what is the format of that information?

6.j Did these systems synthesis a data path for the circuit?

What information, if any, about the desired data path was provided by the user as part of the design input?

6.k Did any of these systems make use of a "knowledge based expert system" or a "knowledge base?"

Which elements of these systems used a "knowledge based expert system" or a "knowledge base?" What functions of the logic synthesis system did those elements perform?

Did these system elements use "rules" to codify design knowledge? (See [DEF022878].) What portions of the logic synthesis problem were these rules designed to address?

6.l What was the form of the output from each of these systems?

Did the users and designers of the systems characterize these outputs as a netlist? On which occasions? What characteristics of these outputs made it appropriate to describe these outputs as a netlist?

If these outputs were netlists, what type of circuit structures were connected in a netlist by the logic synthesis system? Was the system capable of creating netlists of circuit modules as output? Was the system capable of creating netlists of circuit modules from technology libraries as outputs?

6.m Did the Carnegie-Mellon logic synthesis systems prior to 1988 introduce new features not found in other, earlier logic synthesis systems?

What were the most important features introduced by these systems?

What were the most significant advantages that the Carnegie Mellon systems offered over other early logic synthesis systems?

6.n Was any part of the Carnegie-Mellon logic synthesis systems ever distributed to anyone outside CMU? Who was it distributed to? When? Under what conditions? Did they pay to obtain the system? What functionality did the portion of the system distributed perform?

Was any part of the source code ever distributed? Who was it distributed to? When? Under what conditions? Did they pay to obtain the source code?

## 7. DR. KOBAYASHI / ICC / KBSC / RICOH

7.a Prior to this litigation, had Dr. Thomas ever heard of, or had any encounters with, any of Dr. Kobayashi, International Chip Corporation or Knowledge Based Silicon Corporation?

Was Dr. Thomas aware that one or any of these was engaged in research or development of any logic synthesis systems during the 1980s?

Details?

7.b Prior to this litigation, had Dr. Thomas ever heard of work on logic synthesis systems being done at the University of South Carolina?

Details?

7.c Prior to this litigation, had Dr. Thomas ever heard of work on logic synthesis systems being done at Ricoh Corp?

Details?

## 8. CONFERENCES / FIFTH GENERATION COMPUTERS

8.a What conferences did Dr. Thomas attend during the 1980s where logic synthesis work was presented or discussed? How regularly did Dr. Thomas attend such conferences?

8.b What logic synthesis systems whose development Dr. Thomas was not directly involved with, were presented or discussed at these conferences in the 1980s?

8.c Was Dr. Thomas aware of the Japanese Fifth Generation Computer Project during the 1980s? Did Dr. Thomas ever hear of a component of that research program directed to logic synthesis work?

If so, what organizations were involved in logic synthesis research connected to the Fifth Generation Computer program?

How did Dr. Thomas learn of these research programs? Were papers or presentations on this research given at any conference that Dr. Thomas attended or became aware of?

What were the technical characteristics of the systems that were developed during this research?